Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Service Rules for the 746-764 and	)	WT Docket No. 99-168
776-794 MHz Bands, and Revisions to	)	
Part 27 of the Commission's Rules	)	

To: The Commission

COMMENTS OF U S WEST, INC.

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U S WEST, Inc. ("U S WEST") hereby submits its Comments in response to the Commission's *Notice of Proposed Rulemaking* in the above-captioned proceeding.[1]

I. INTRODUCTION AND SUMMARY

This proceeding presents a unique opportunity for the Commission to take a major step in fostering the development of new, innovative and cost-effective fixed and mobile wireless technologies and services utilizing the 746-764 and 776-794 MHz bands ("the 700 MHz band"). If it seizes this opportunity, the Commission will succeed in facilitating technological and service innovation, thereby creating new jobs for the American workforce, fostering national economic growth, and enhancing opportunities for all Americans to utilize, and realize the benefits of, the national telecommunications infrastructure. To advance these goals, the Commission must adopt service rules that encourage development of service platforms that will support use of the 700 MHz band for the new broadband services needed to satisfy the current and future demand

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[1] *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 99-168, *Notice of Proposed Rulemaking* (released June 3, 1999) ("*Notice*").

created by the explosive growth of the Internet. Only by crafting service rules that optimize this band's use for services of the future will the Commission create an environment in which equipment manufacturers will have economic incentives to develop these platforms.

U S WEST supports many of the proposals in the Commission's *Notice* that advance these goals,[2] but in the interest of brevity will not address all of these proposals individually. Instead, these comments are focused on a few of the most critical issues regarding the service rules for the 700 MHz band which the Commission must resolve.

II. SPECTRUM BLOCK AND SERVICE AREA SIZES BOTH SHOULD BE LARGE ENOUGH TO ENCOURAGE DEVELOPMENT OF NEW, INNOVATIVE SERVICES OF NATIONAL SCOPE.

The greatest demand for spectrum today is for broadband services that can satisfy the large and growing need for capacity to carry traffic spurred by the explosive growth of the Internet. In the past few years, the marketplace has made it clear that a nationwide "footprint" is considered necessary for large scale broadband services. To be truly competitive, broadband services provided on the 700 MHz band will need national scope. By adopting a licensing scheme for the 700 MHz band that includes a significant amount of spectrum in a nationwide license, the Commission would encourage the development of new, innovative services of national scope, thereby promoting competition while maximizing the return on this spectrum for the public.

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[2] For example, U S WEST supports the Commission's proposals regarding universal eligibility, applicability of the Part 27 regulatory framework, partitioning and disaggregation, and the competitive bidding rules.

Either through acquisitions or strategic relationships, the major wireless companies have been developing services of national scope.[3] This process of private consolidation has proven, in effect, that the value of a nationwide authorization is greater than the sum of its parts, and has made winners of the initial regional licensees who have sold out to the nationwide aggregators. The upcoming auction of licenses in the 700 MHz band offers the Commission an opportunity to recover this spectrum's true value for the benefit of American taxpayers.

In addition, as explained below, U S WEST believes that, because of the economics of manufacturing new equipment for use in this band, a competitive, breakthrough service offering on the 700 MHz band can only be successfully introduced if a significant amount of spectrum is devoted to a single nationwide license. U S WEST therefore urges the Commission to provide that 24 MHz of the 700 MHz band be auctioned as a single nationwide license, with 12 MHz paired with 12 MHz.[4]

A. Attracting The Investment Necessary To Rapidly Deploy New Technologies and Services In The 700 MHz Band Will Require A New Market of Substantial Scale and Scope.

Establishing a nationwide license will enable that licensee to offer to prospective suppliers a market of sufficient scale and scope to provide economic incentives for investment in equipment that is needed for rapid deployment of new technologies and services. If licenses are auctioned for small geographic regions, a hodge-podge of licensees would likely emerge, representing several different types of service offerings. Equipment suppliers, if they are to

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[3] AT&T, Sprint, Nextel, and others have accumulated spectrum holdings or established strategic relationships so as to be able to market or provide services across the nation.

[4] This nationwide license should occupy the spectrum currently used for UHF channels 61, 62, 66 and 67 (*i.e.*, 752-764 and 782-794 MHz).

invest in new technologies and services, must be able to identify a potential new market of substantial size. The balkanized landscape of different licensees with different service offerings that would emerge in the absence of a nationwide license would not provide an attractive investment opportunity, and therefore would discourage such investment. This problem would be particularly acute in the instant case, because there is no pre-existing base of equipment upon which to build -- no hardware or chipsets currently exist for mobile or fixed wireless 700 MHz operations.

In contrast, establishing a channelization plan that enables a single licensee to gain a national market presence through the auction process will create a new service opportunity of sufficient scope and scale to attract investment and thereby meet the Commission's objective of promoting rapid deployment of new technologies and services.

With respect to spectrum block size, U S WEST understands the desire to make available as many different service options as possible in this newly-reallocated spectrum. However, given the realities of today's broadband marketplace, in which CMRS spectrum holdings of 45 MHz are permissible, U S WEST believes that, to create a new, innovative service that could be competitive in the broadband market, a nationwide assignment of 24 MHz is needed. A 12 MHz paired band will stimulate the development of new and unique services which can be developed more efficiently and effectively in a broader contiguous band of spectrum. New technologies are moving away from the narrow channel structure of present communications systems, historically tailored for narrowband voice or broadcast television, and are striving to

adapt to the ever-growing demands for broadband communications.[5] The efficiency of utilizing broader bands has become a fundamental tenet of spectrum management. The FCC can help foster the development of new, efficient, cost-effective services by providing a basis for market planning by potential bidders which includes fundamental support for a broadband channel model. This is an opportunity for the FCC to stimulate the development of hardware which will support future services by providing an optimal spectrum structure designed for services of the future, and not solely devoted to preserving present business models.

Furthermore, as explained in more detail in the attached Exhibit 1, efficiencies in infrastructure costs are realized as the amount of bandwidth used to provide broadband access increases. With a 24 MHz assignment, such efficiencies will facilitate competition, especially because a new nationwide competitor will be using spectrum never before used for broadband access.

Adoption of the proposed 24 MHz nationwide assignment also would permit 12 MHz to be authorized in smaller geographic regions. U S WEST proposes that this remaining 12 MHz be channelized as a single 12 MHz license (6 MHz paired: 746-752 MHz paired with 776-782 MHz) that would be auctioned in service areas no smaller than Major Economic Areas ("MEAs"). Such a channelization scheme will allow businesses to pursue more local or regional market opportunities for a variety of possible new service offerings without jeopardizing the creation of a new nationwide competitor. In addition, a 6 MHz paired license will provide a

[5] An example of the industry's recognition of the need to support higher bandwidth in wireless communications is the evolution to 3G technology in CDMA, which uses a 5 MHz "channel" (as opposed to the current 1.25 MHz).

migration path to 3G wireless technologies for wireless companies now holding only 10 MHz broadband PCS licenses.

In sum, U S WEST urges the Commission to adopt the following channelization plan:

Block	Frequencies	Licensed Service Areas
A	746-752 MHz paired with 776-782 MHz	52 Major Economic Area Licenses
B	752-764 MHz paired with 782-794 MHz	One Nationwide License

U S WEST believes that this channelization plan is best tailored to achieve the Commission's goals of promoting technological and service innovation and fostering new competition. In addition, this proposal appropriately balances competing interests: it would promote the creation of new nationwide competition in innovative broadband services, and at the same time allow for a variety of other services. This proposal also would maximize the value of the licenses being put up for bid by the Commission, thereby offering the best return for the public on the spectrum resource.

III. BROADCAST SERVICES SHOULD NOT BE PERMITTED IN THE 746-764 AND 776-794 MHz BANDS.

If the objective of developing competitive new broadband wireless services in the 700 MHz band is to be achieved, the Commission also must ensure that the band is usable for these services. This requires limiting broadcast operations in the band.

Though the Balanced Budget Act of 1997 authorizes the Commission to provide for flexibility in spectrum use, Congress set forth clear limits on the exercise of this authority.

Before allocating any particular spectrum for flexible use, the Commission must make an affirmative finding that (1) such an allocation would be in the public interest, (2) such use would not deter investment in communications services and systems, or technology development, and (3) such use would not result in harmful interference among users.[6]

In the *Notice*, the Commission voiced its tentative finding that

> "making the [700 MHz] spectrum available for flexible commercial use under our Part 27 Rules is in the public interest because it will contribute to technological innovation and service innovation, the creation of new jobs for the American workforce, the fostering of national economic growth, and the enhancement of opportunities for all Americans to utilize, and realize the benefits of, the national telecommunications infrastructure."[7]

While fully supporting these goals for Commission spectrum management, U S WEST disagrees that providing for full flexibility (including potential broadcast use) in the 700 MHz service rules advances these objectives. To the contrary, allowing new broadcast services to occupy this band would deter necessary investment in new services and systems, impede the development of new technologies, and raise the likelihood of intolerable interference, thus dimming the prospects for this reallocated spectrum and perhaps rendering it practically worthless to prospective wireless service providers in many geographic areas.

The Commission recognizes that the potential sharing of this spectrum between broadcast service licensees and fixed and mobile wireless licensees "might affect investment in new

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[6] *See* 47 U.S.C. § 303(y)(2). U S WEST fully supports the Commission's decision to undertake an analysis of the Section 303(y)(2) allocation factors in its consideration of service rules in this proceeding. Such an analysis is necessary in light of the fact that these issues were not considered in either of the Commission orders specifically addressing the reallocation of spectrum in the 700 MHz band.

[7] *Notice* at ¶ 12.

technologies or more generally affect the development of non-broadcast services in these bands . . . ."[8] Though the potential effects would vary depending upon the specifics of each situation, U S WEST strongly believes that adjacent channel interference from full-power broadcast operations in a service area would significantly interfere with fixed and mobile wireless operation in that service area. Additionally, co-channel interference problems would be created along the borders of service areas if broadcast services are allowed to operate in the 700 MHz band. A more detailed analysis of the engineering issues involved is contained in the attached Exhibit 1.

In short, the laws of physics preclude interference-free operation by any wireless system if a traditional broadcast station is operating on the same or nearby spectrum and in the same area. If the 700 MHz band is not saddled with these interference concerns, and if this spectrum is channelized appropriately and licensed in geographic areas of sufficient size,[9] the opportunities for the development of new and innovative wireless technologies and services will be obvious to the manufacturers of equipment needed to provide these services. The public would then benefit from rapid deployment of new services using the 700 MHz band. If, however, the prospect of broadcast use of this band raises the specter that new broadband wireless services will not be interference-free, manufacturers may well be unwilling to devote the resources necessary to develop these new technologies and services.

In the *Notice*, the Commission stated that its determination as to whether broadcast services should be permitted to share the 700 MHz band with fixed and mobile wireless services

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[8] *Notice* at ¶ 14.

[9] *See* discussion *supra*.

would depend largely upon whether interference between these technically dissimilar services can be effectively managed.[10] U S WEST agrees that the interference issues are crucial to resolving the sharing issue. Because we believe that the interference concerns raised by the potential for shared use of the 700 MHz band between broadcast service licensees and fixed and mobile wireless service licensees cannot be satisfactorily resolved, U S WEST urges the Commission to adopt a rule restricting new broadcast services from operating in this band. It is worth noting that excluding new broadcast operations from this band should not be particularly burdensome, as significant amounts of analog and digital spectrum already are available to broadcasters.

IV. THE COMMISSION SHOULD ALLOW NEW LICENSEES AND INCUMBENT UHF BROADCASTERS TO REACH AGREEMENTS THAT WOULD ACCELERATE THE TRANSITION TO DIGITAL TELEVISION.

As noted above, U S WEST believes that concurrent use of the 700 MHz band by both broadcast services and new broadband wireless services will not be technically feasible. Thus, even if the new service rules restrict new broadcast operations in the band (as recommended above), the current operations by UHF television stations now occupying this spectrum substantially inhibit new wireless licensees from fully, efficiently and expeditiously using the 700 MHz band.[11] U S WEST recognizes that the schedule for broadcasters to transition to digital

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[10] *See Notice* at ¶ 7.

[11] UHF broadcast stations currently are in operation in the 700 MHz band in most of the major markets in the United States.

television ("DTV") is mandated by statute.[12] The law does not, however, prevent broadcasters from accelerating their transition to DTV. Indeed, the Commission has proposed to permit new licensees in the 700 MHz band to reach agreements with incumbent UHF licensees under which the television licensees would convert to DTV-only transmission before the end of the transition period or otherwise accommodate new licensees in the band.[13] U S WEST support this proposal, and believes that allowing for such agreements is crucial to the success of the auction of new licenses to use the 700 MHz band.

As noted above, U S WEST expects that the highest valued use of the 700 MHz band will be for the provision of new broadband wireless services that cannot co-exist in the same geographic area with traditional broadcasting operations. If new licensees are not given the right to reach private agreements with the incumbent UHF broadcasters, the 700 MHz band will be largely unusable in many regions until December 31, 2006, at the earliest.[14] Without commenting on whether it will be possible to reach mutually beneficial agreements with the UHF broadcasters operating on channels 60-69, U S WEST strongly urges the Commission to permit negotiations for such agreements to take place. Not doing so will significantly devalue the 700 MHz band and prevent needed new services from being introduced at the earliest possible date. The public interest in expeditious development of new technologies and deployment of new services dictates that the Commission do everything possible to avoid that result.

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[12] *See* 47 U.S.C. § 309(j)(14).

[13] *See Notice* at ¶ 99.

[14] Section 309(j)(14) of the Communications Act requires the Commission, upon request, to indefinitely extend a television station's license beyond the December 31, 2006 transition date if certain DTV penetration levels have not been achieved in that station's market.

V. CONCLUSION

The Commission is in a position to promote the establishment of a vibrant new nationwide competitor in a crucial market segment — the market for broadband services to satisfy Internet-driven demand. Happily, doing so also will maximize the value of the 700 MHz licenses being offered and afford American taxpayers the best return on this public asset. U S WEST respectfully submits the suggestions outlined above will best enable the Commission to seize this unique opportunity to advance important public policy goals.

Respectfully submitted,

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Engineering Considerations in the UHF Band

This paper addresses technical and operational concerns regarding wireless communications service offerings in the upper UHF television bands (channels 60-69), as recently reallocated by the FCC. Considerations in this paper were derived from U S WEST's prior testing and experience in wireless service offerings as well as from technical discussions with equipment manufacturers.

The spectrum that the FCC is considering consists of two 18-MHz bands: 746-764 MHz and 776-794 MHz (UHF channels 60-62 and 65-67). Set forth below is a discussion of the engineering issues associated with wireless operations in this frequency block as well as of the potential interference problems with neighboring broadcasters.

Equipment Availability
Most of the RF families of devices currently available on a large scale are designed for use above 800 MHz. Equipment vendors seem to favor the approach of trying to adapt the 800 version, but shifting designs to lower frequencies may be difficult and time consuming, since most chips are designed for a given band. Equipment availability at these frequencies is poor, but can greatly improve within 8 to 12 months.

Adjacent Broadcast Interference
Deployment of services involving broadband, mobile services in a cost-effective manner is not consistent with the presence of adjacent channel broadcast services. The presence of broadcast services in adjacent spectrum would require exceptionally high link margins, thus limiting applications to non-mobile and/or narrowband applications.

Per 47 C.F.R. 73.687, UHF channels must attenuate out-of-band emissions 3 MHz from band edge to be at least 60 dB down from the visual transmitted power. Since 73.614 constrains maximum transmit power to < 67 dBW, this means that worst case out-of-band emissions would be as high as 7 dBW. Given typical system sensitivity, there would need to be propagation loss of the UHF broadcast signal on the order of 135 dB (assuming no antenna isolation to UHF transmitter) to insure against service disruption assuming a broad-beam user antenna. Propagation modeling suggests required separation of user device from UHF transmitter would need to be on the order of 5 to 20 km, depending on transmit elevation and shadowing.

In the Notice of Proposed Rulemaking for this 700 MHz spectrum (FCC 99-97, at para. 89), the Commission notes that land mobile services and TV broadcast service have coexisted in the 470 to 512 MHz bands (Channels 14 to 20). We would point out that the mobile services using these bands are generally narrowband services, which are less sensitive to interference than broadband services.

Out-of-Band Emissions
Out-of-band emission requirements are of utmost importance. In that respect, U S WEST evaluated the emission limits proposed by the Commission in the NPRM and found them well suited to the practical development of low-cost broadband consumer devices. U S WEST supports the Commission's proposed limits.

Spectrum Pairing

One major concern is the practicality of building PCS-like equipment for the proposed UHF blocks given that the frequency separation is only 30 MHz. But such separation appears sufficient for equipment manufacturers to produce adequate filters in diplexers for an FDD implementation. For example, a 6 MHz passband filter passing the lower 746-752 MHz band would probably need 60 to 70 dB of rejection in the paired 776-782 MHz band. Filter theory teaches us that this could be achieved in a 0.2 dB ripple Tchebyscheff with 3 or 4 poles. As a result, pairing of these bands is technically feasible.

Further, to better anticipate future service needs, we urge the commission to allow flexibility within the bands. In particular all modulation and duplexing schemes should be allowed.

Bandwidth Requirements

With the increasing demand for broadband services, it is important to optimize the frequency bands in question to allow for such service offerings. In that perspective we show below the normalized infrastructure cost involved in providing broadband access on a per subscriber basis.

We present in particular the following conclusions. Broadband services benefit significantly in effectiveness from more available bandwidth. Moreover, contiguous spectrum provides additional value. As an overall result, we feel that the best frequency allocation would consist of two spectrum blocks: one 24 MHz license (two 12-MHz paired blocks) and one 12 MHz license (two 6-MHz paired blocks).

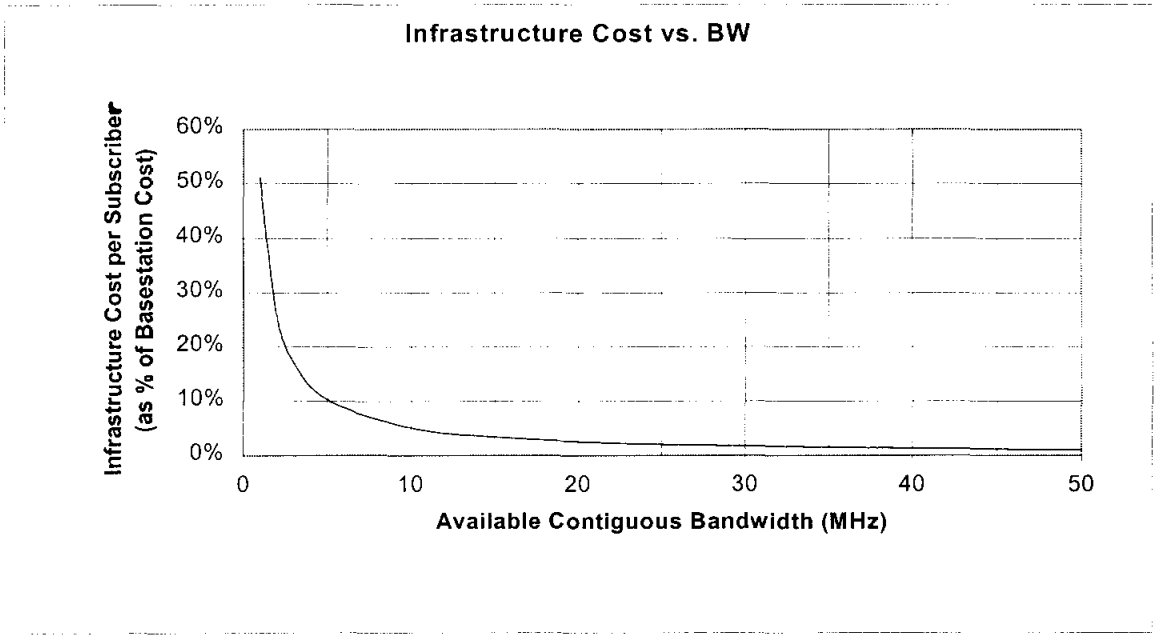

Figure 1: Infrastructure Cost per Subscriber vs. Bandwidth